

NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

September 28, 2010

Precipitation and Snowpack

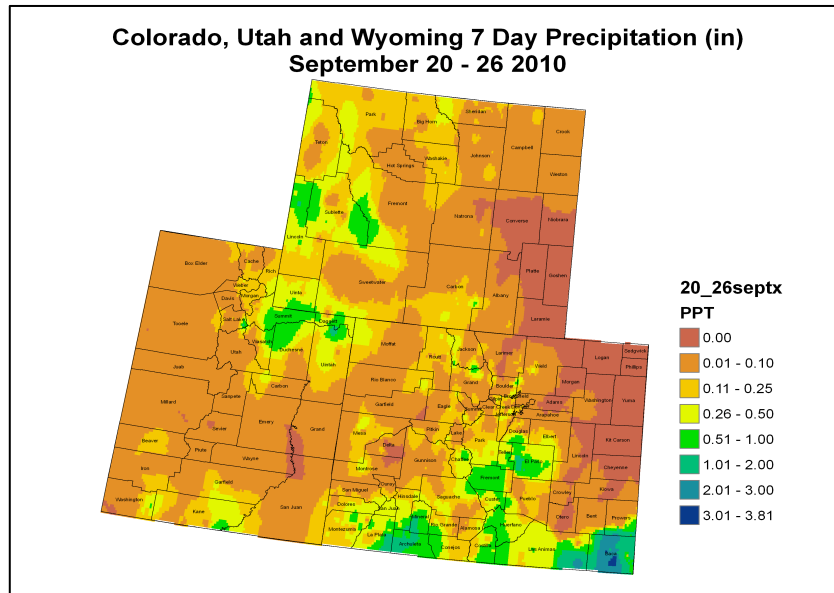


Fig. 1: September 20 – 26 precipitation in inches

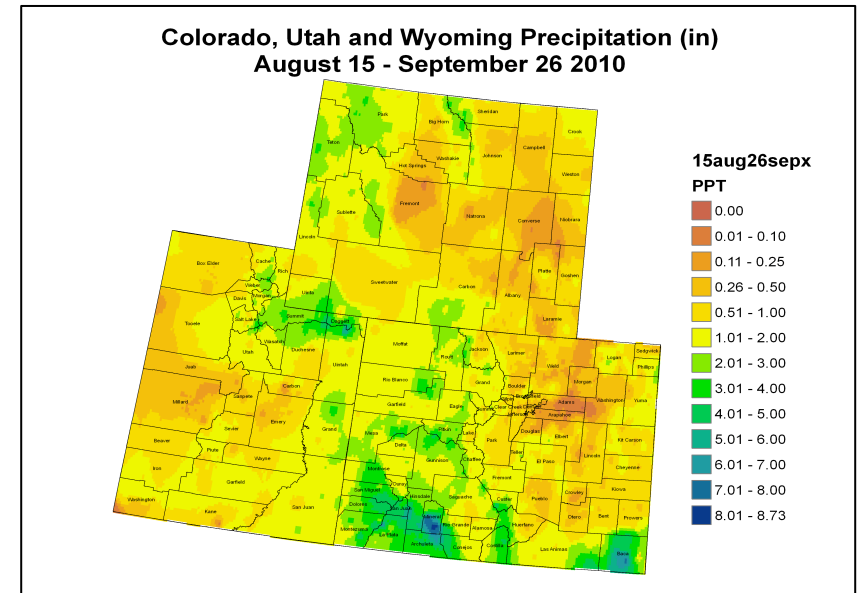


Fig. 2: Aug 15 – Sep 26 precipitation in inches

Spotty showers were experienced throughout the Upper Colorado River Basin (UCRB) last week (Fig. 1). The Lower and Upper Green River basins received around 0.25 to 1 inch of rain, and the San Juan and Rio Grande basins also received decent amounts of moisture. East of the UCRB, eastern Wyoming and eastern Colorado received little to no precipitation over the past week.

The dryness experienced over the past week has been part of a longer-term dry pattern that the UCRB and surrounding areas have experienced since mid-August (Fig. 2). The Rio Grande and San Juan basins have seen the greatest amounts of precipitation since August 15, with northeastern Utah also seeing beneficial rains. Areas east of the basin have seen extremely dry conditions since mid-August.

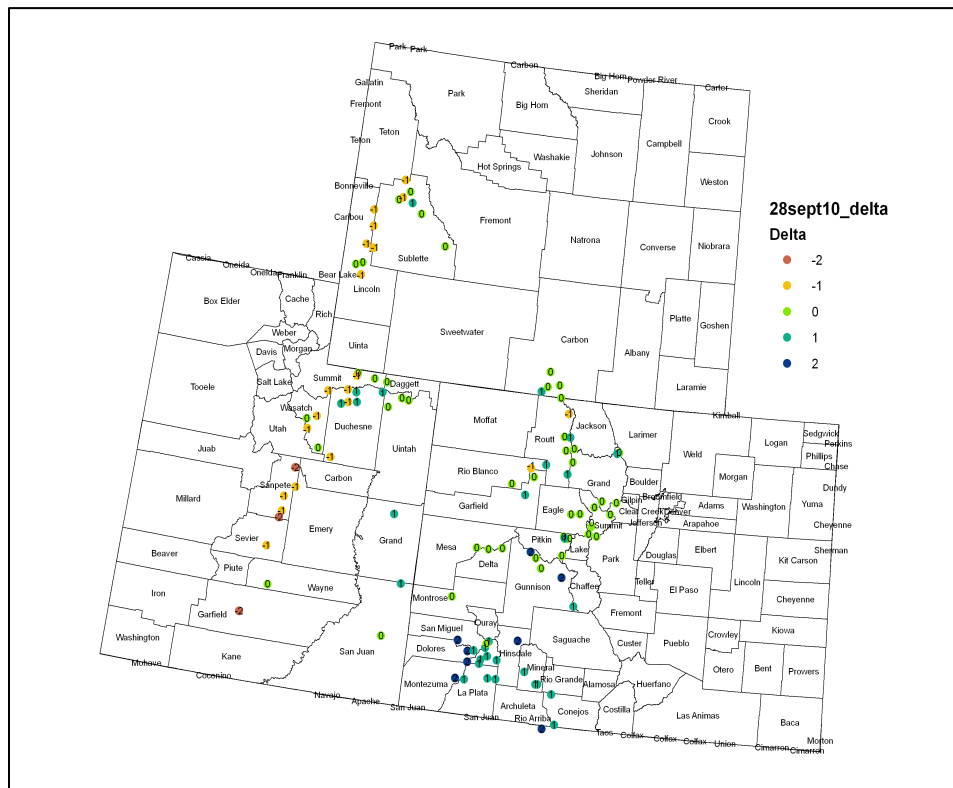


Fig. 3: SNOTEL WYTD precipitation percent of average change from last week.

Very little changes were seen in northwestern Colorado's SNOTEL water-year-to-date (WYTD) precipitation percents of average from last week (Fig. 3). In the south, the Rio Grande and San Juan basins, precipitation over the past week helped boost the precipitation percents of average around 1 – 2% from last week. The western boundary of the UCRB (in Utah and Wyoming) experienced decreases from last week of about 1%.

WYTD percentiles for the SNOTEL sites in the UCRB show the lowest values corresponding with locations of current abnormal dryness (D0 category, lower than the 30th percentile) on the U.S. Drought Monitor map—in the Rio Grande basin, the Upper and Lower Green River basins and near the Colorado headwaters region (Fig. 4).

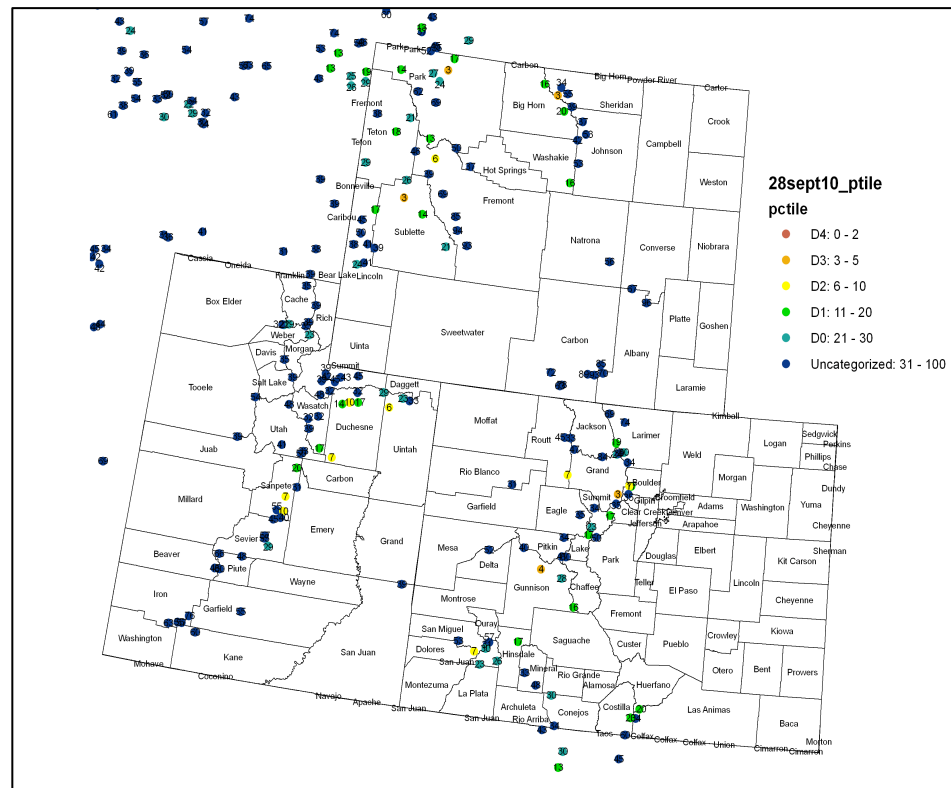
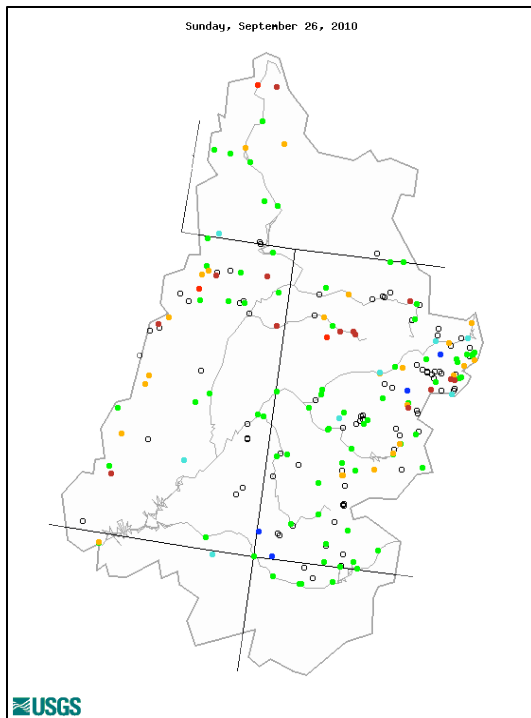


Fig. 4: SNOTEL WYTD precipitation percentiles (50% is median, 21-30% is Drought Monitor's D0 category).

Streamflow

As of September 26th, about 64% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile range) or above normal 7-day average streamflows (Fig. 5). This is a slight improvement from last week (45% of the gages in the UCRB recorded below normal flows last week), but still down from the end of August when nearly 90% of the streamgages reported normal or higher flows. Below normal flows are found in the Colorado Headwaters region, along the White River, and along the western boundary of the UCRB in UT.

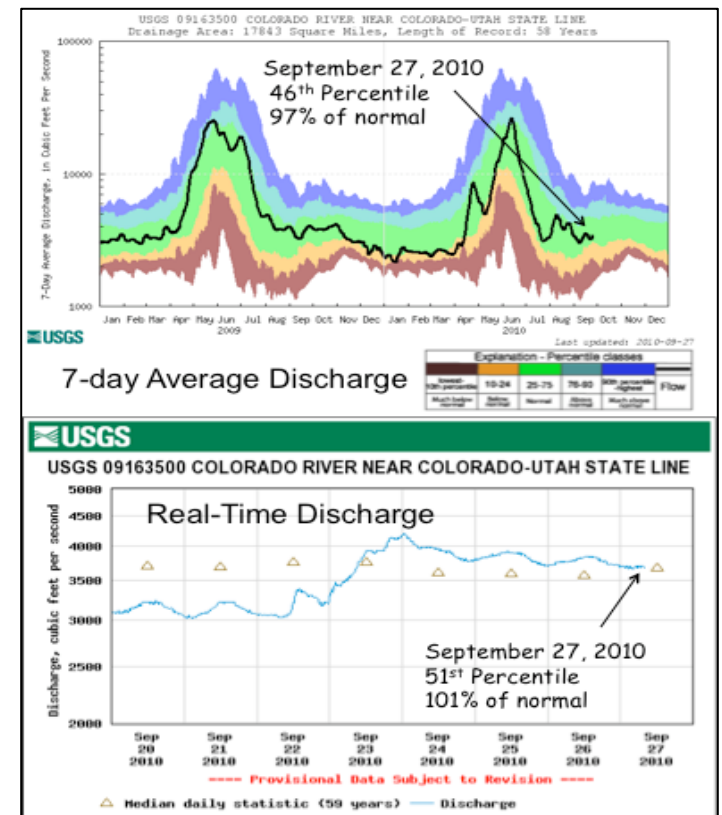
Looking at a hydrograph on the Colorado River near the CO-UT state line, streamflows have seen an overall decline for the past couple of months, which is normal for this time of year, and current 7-day average streamflow is within the normal range—97% of normal (Fig. 6). Real-time discharge has stayed slightly above the median for the past week (bottom Fig. 6).



Explanation - Percentile classes							
●	●	●	●	●	●	●	○
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

Fig. 5: USGS 7-day average streamflow compared to historical streamflow for September 26th in the UCRB.

Fig. 6: USGS 7-day average discharge over time (top) and real-time discharge for the past week (bottom) on the Colorado River near the CO-UT state line.



Water Supply and Demand

Temperatures remained above average for the UCRB over the past week. Since September 1st, most of the UCRB has seen slightly above average temperatures while temperatures east of the mountains have been as high as 6 – 8°F above average. Soil moisture is short for much of the UCRB (Fig. 7), with dry regions in the Lower Green basin, the Yampa-White and Colorado basins, and in the Rio Grande basin. VegDRI shows particularly dry conditions along the southern boundary of the South Platte basin.

Many of the major reservoirs in the UCRB are now slightly below their September averages after experiencing large drops over the past month. Since September 1st, Green Mountain Reservoir has dropped 27k acre feet (normal August – September drop is 11.7k acre feet), and Lake Dillon has dropped 14k acre feet (normal August – September drop is 6.2k acre feet). Lake Granby, McPhee, and Navajo Reservoirs remain above average. Lake Powell has seen an 89k acre foot drop since September 1st, which is less than a normal drop for this time of year, but inflows into the lake this month (at 56% of average) were well below what was projected.

Precipitation Forecast – Short Term

Stubborn high pressure ridge centered over the spine of the Rockies will lead to persisting dry conditions for the UCRB. Expect this pattern to continue until this weekend, when models begin to introduce some Pacific moisture into the southwestern portions of the basin. Currently unsure if this moisture plume will be substantial enough lead to any measurable rainfall, or just high based dry thunderstorms. Latest QPF fields now show a small area of 0.10 to 0.25 inches centered over south-central CO on Friday and Saturday, which is much wetter than Monday evening's run. Beyond the weekend, forecast guidance shows the high pressure center moving south and east of the UCRB which allows for some upper level energy to move across the area. Unfortunately inconsistencies in the forecast models limit the details of this pattern shift, and leave the precipitation outlook uncertain for the next week.

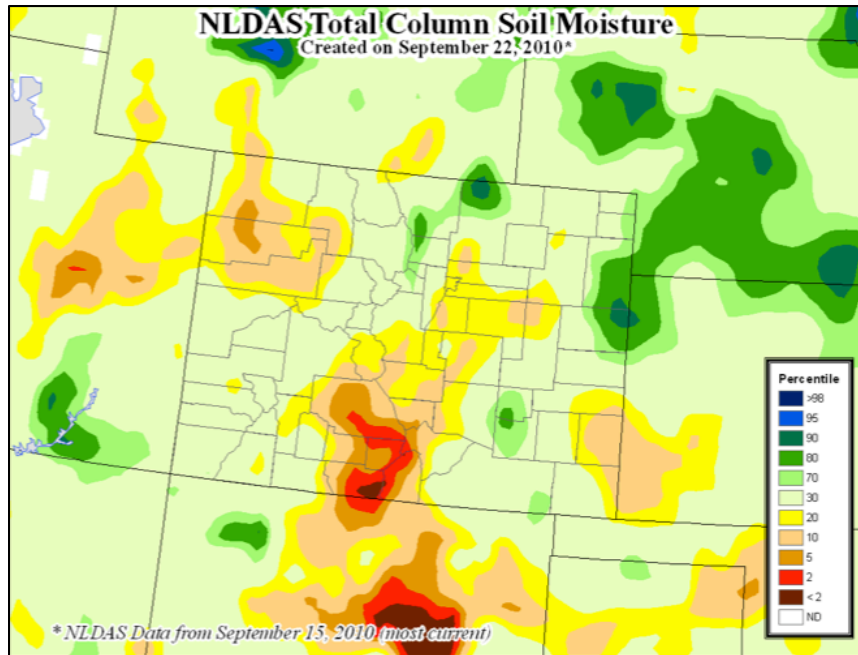


Fig. 7: NLDAS Total Column Soil Moisture percentiles as of September 22nd.

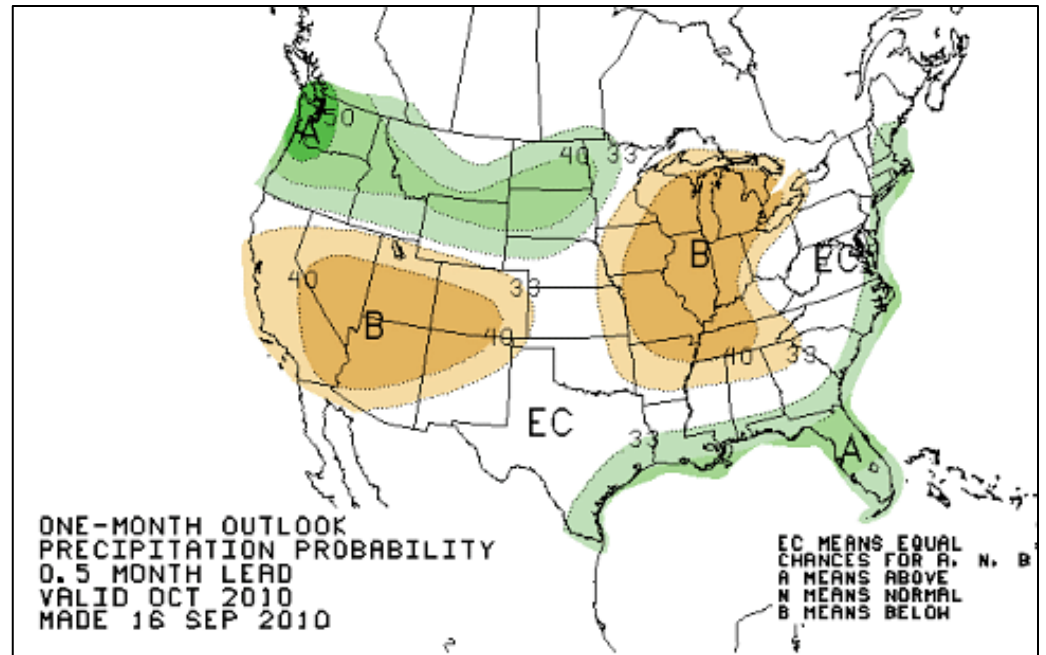


Fig. 8: Climate Prediction Center's one month outlook for precipitation probabilities. A (B) means above (below) normal chances for average precipitation.

Precipitation Forecast – Long Range

Dry conditions will likely persist for the next month (Fig. 8) and even possibly for the next 3 months. Above average temperatures are also likely to remain in the region for the rest of fall. El Nino ended earlier this summer, and Equatorial Pacific Ocean temperatures quickly switched to La Nina conditions, which have steadily strengthened over the past couple of months. It is expected that La Nina will continue to strengthen and last through the spring of next year. La Ninas are consistent with drier than average conditions over the southwestern U.S. (which might affect the southern part of the UCRB) and wetter than average conditions in the northwest and northern Rockies (which could possibly extend down into the northern mountains of the UCRB). Overall, the UCRB has proven to see variable conditions in past La Ninas.

Drought and Water Discussion

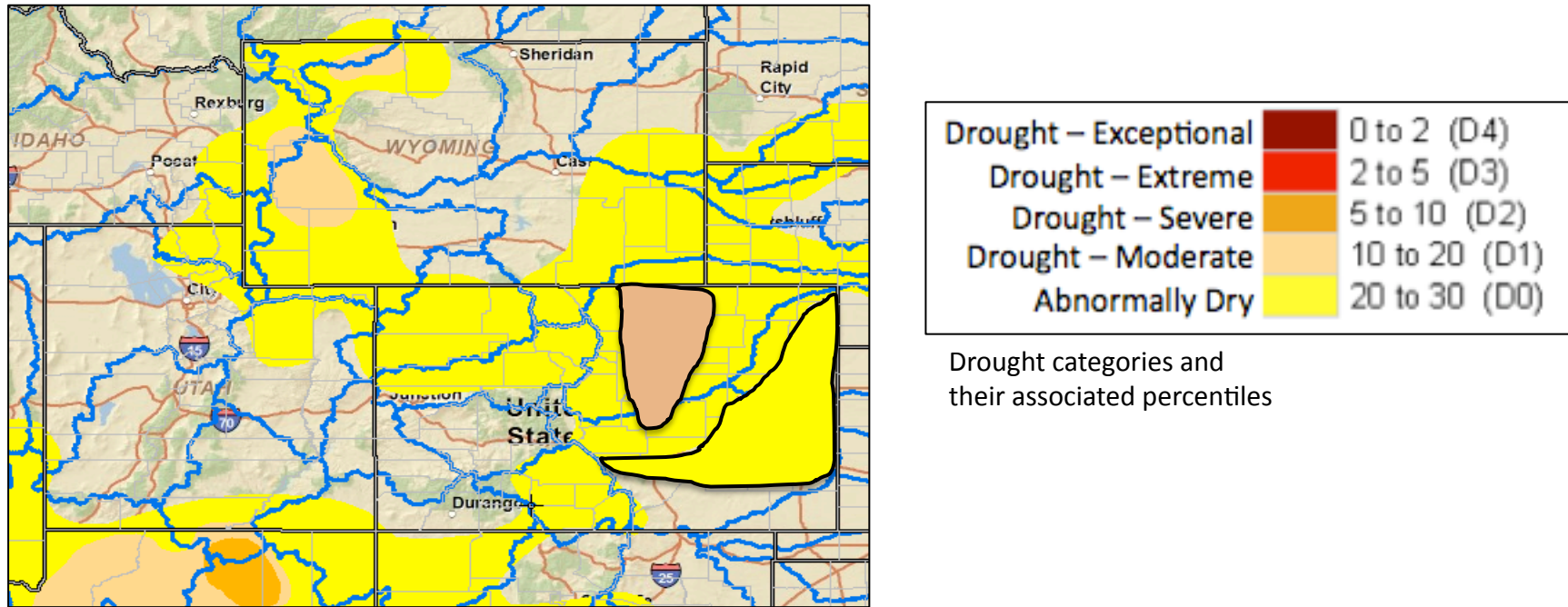


Fig. 9: September 21 release of U.S. Drought Monitor for the UCRB

Due to continuing dry conditions (evident now on the 30-day and 60-day time scales), expansion of D0 and introduction of D1 in eastern Colorado are being suggested for the Drought Monitor map (Fig. 9). The pink shaded area is situated over a region with large precipitation deficits over the past 30 days and 60-day SPI values of around -1 to -2. This area should be considered for introduction of D1. The suggested D0 expansion (the yellow shaded area in black outline) is correlated with areas in eastern Colorado experiencing deteriorating soil moisture conditions and 30-day precipitation deficits.

The Drought Monitor author has expanded D0 in Wyoming (mostly in the southeastern and northern parts of the state) to cover areas which received minimal precipitation this past week and are also showing longer term deficits. There are currently no disagreements to this expansion.